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Patentanmeldung Nr. Patent application No. Demande de brevet n°

03103217.0

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Method for recording information on a multi layer record carrier, and record
carrier for use by the method

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Method for recording information on a multi layer record carrier, and record carrier for use by the method

The invention relates to a method of recording information on a multi layer record carrier. The invention relates especially to a method of recording information on a dual layer recordable DVD disc, such that this disc can be played in any DVD-ROM player. The invention further relates to a record carrier for use by the method according to the
5 invention, said record carrier comprising at least two information layers for storing the information.

After recording information on a dual layer recordable DVD record carrier,
10 special actions need to be taken to make the record carrier compatible with existing playback devices. When a recordable DVD record carrier has to be made DVD-ROM compliant, such that the recordable DVD record carrier can be played back in any DVD-ROM player, any unwritten zones need to be filled with dummy data because most DVD players cannot cope with a record carrier on which the information layer opposite to the information layer holding
15 the information is not written with EFM.

The total available size for storing data on a dual layer OTP-type (Opposite Track Path) DVD record carrier (recordable, rewritable, as well as read-only discs) is dependent on the location of the middle zone. When the amount of information to be written is known on forehand, the location of the middle zone can be decided prior to writing.
20 However, when information of a previously unknown size has to be written on a dual layer recordable DVD record carrier, the location of the middle zone should preferably be placed at the maximum allowed position, which results in a maximum storage space. A downside of placing the middle zone at the maximum allowed position is the amount of time the filling with dummy data may take.

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Pending European Patent Application EP03103210.5 (PHNL031042)
describes a method of arranging the information on a dual layer record carrier such that the

amount of time required for making the record carrier compatible with existing playback devices, especially with DVD-ROM players, is reduced to a minimum, without prior knowledge of the amount of information that should be stored. In this method the information is distributed over the information layers of the multi layer record carrier during the recordings according to a specific filling pattern. By using this specific filling pattern the amount of time needed to close/finalize the session or disc is significantly reduced. In the method described in European Patent Application EP03103210.5 recording is switched from a first layer of the disc to a second layer of the disc each time a predefined amount of storage space is filled. This is schematically shown in figure 1, where paths 1 and 3 indicate write sequences, and paths 2 and 4 indicate layer jumps. A dual layer disc, as shown in figure 1, comprises two information layers, generally referred to as the L0 and L1 layers. The L0 layer is the information layer located closest to the side of a disc where a radiation beam, such as a laser beam, used for reading and/or recording the information enters the disc. The drive initially writes a predefined amount of information (block 1) to layer L0 and then switches to layer L1 to write the next predefined amount of information (block 2). Next, the drive jump back to layer L0 to record in the predefined amount of storage space (block 3) behind recorded block 1.

It is an object of the present invention to further improve the method described in European Patent Application EP03103210.5 by making it more flexible.

In the method according to the invention the predefined amount of storage space (that is, the block size) is not a fixed amount, but it is an amount that is variably set by the method itself. In a preferred embodiment of the method according to the invention, a value specifying the predefined amount of storage space is read from the record carrier itself. The size of the predefined amount of storage space influences the time required for closing a session and/or finalizing a disc. The smaller the size of the predefined amount of storage space, the faster the closing of a session and/or the finalizing of a disc will be. This because the amount of dummy data that needs to be recorded upon closing and/or finalizing is reduced. However, such a small size of the predefined amount of storage space will increase the amount of layer jumps, which could negatively affect the recording performance. Moreover, because of the small block sizes, the number of track jumps (jumps from one block of information to another block of information) when reading the record carrier will increase. Therefore, the optimum size of the predefined amount of storage space is dependent

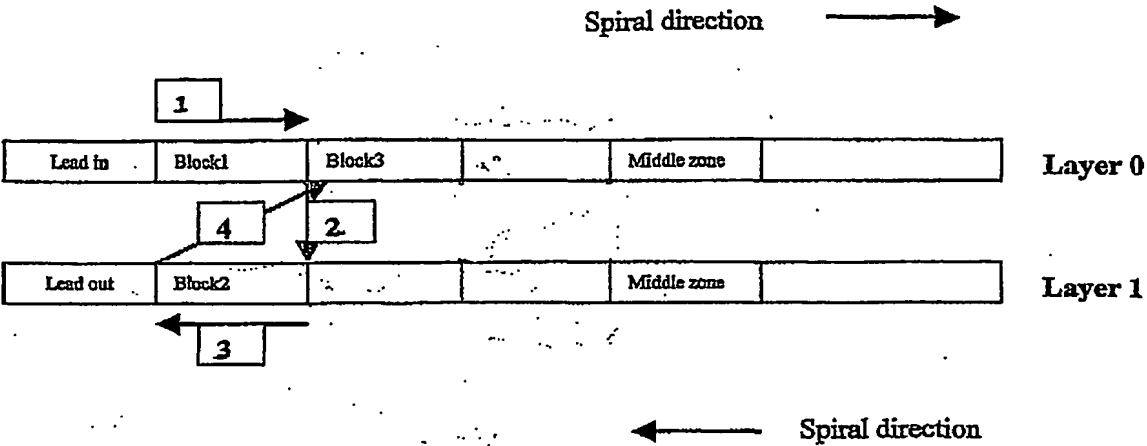
on the type of use of the record carrier (such as, for example, recording of a continuous video stream or recording of data files).

According to the invention the size of the predefined amount of storage space is flexibly set depending on the type of use of the record carrier. The method may set the size automatically depending on the amount of data to be stored, on the way the data to be stored

is supplied to the method (streaming or as fragmented blocks), or on the application. Alternatively, the size is set manually by a user. Moreover, this size needs not be fixed during the entire use of the record carrier, but may be changed between recording sessions. For example, a first recording session may be recorded with a first size of the predefined amount of storage space, while a subsequent second recording session may be recorded with a second size of the predefined amount of storage space, the second size being different from the first size. In this way, a single record carrier may support different types of uses.

According to a preferred embodiment, the method reads the size of the predefined amount of storage space from the record carrier itself. This size may be stored on the record carrier as a parameter in an area on the record carrier comprising parameters indicative of the recording process.

When the type of use of the record carrier is fixed and/or a good size of the predefined amount of storage space is known beforehand, this size may be prerecorded on the record carrier. Alternatively, the size of the predefined amount of storage may be recorded on the record carrier by the method itself. In this way, the last selected size of the predefined amount of storage space is stored for re-use in a subsequent recording session.



CLAIMS:

1. A method of recording information on a multi layer record carrier, said record carrier comprising at least two information layers for storing the information, wherein the method comprises
 - an initialization step of setting the size of a predefined amount of storage space, and
 - a subsequent recording step of recording information on said at least two information layers such that the information is recorded alternately on said at least two information layers, the recording step comprising the steps of
 - recording information on a layer until the predefined amount of storage space is filled, and subsequently recording information on a different layer of said at least two information layers.
2. Method according to claim 1, wherein in the initialization step a value indicative of the size of the predefined amount of storage space is read from the record carrier, and wherein the size of the predefined amount of storage space is set in dependence on the read value.
3. Method according to claim 2, wherein the method comprises a further step of recording a value indicative of the set size of the predefined amount of storage space on the record carrier.
4. Method according to claim 1, wherein the size of the predefined amount of storage space is set in dependence on the amount of information to be stored, or on the way the information to be stored is supplied to the method, or on the type of application supplying the information.
5. A method of recording information on a multi layer record carrier, said record carrier comprising at least two information layers for storing the information, wherein the method comprises

a first initialization step of setting the size of a first predefined amount of storage space, and a subsequent first recording step in a first recording session for recording information on said at least two information layers such that the information is recorded alternately on said at least two information layers, the first recording step comprising the steps of recording information on a layer until the first predefined amount of storage space is filled, and subsequently recording information on a different layer of said at least two information layers, and a

a second initialization step of setting the size of a second predefined amount of storage space, and a subsequent second recording step in a second recording session, the second recording step comprising the steps of recording information on a layer until the second predefined amount of storage space is filled, and subsequently recording information on a different layer of said at least two information layers

6. A multi layer record carrier comprising at least two information layers for storing information, said record carrier comprising a region holding parameter values indicative of a recording process for recording information on the record carrier, characterized in that said region comprises an area for holding a value indicative of the size of a predefined amount of storage space, said value indicative of the size of a predefined amount of storage space used in a method according to claim 2 or 3.

ABSTRACT:

The invention relates to a method for recording information on a multi layer record carrier such that the information is substantially evenly distributed over the layers in blocks of a predefined amount of storage space. According to the invention the size of these blocks is flexible and set by the method itself. In an embodiment, the size of the blocks is

5 read from the record carrier.

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